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Published in:
Papers in Regional Science

DOI:
10.1111/pirs.12418

Publication date:
2019

Received: 7 October 2017 | Revised: 9 November 2018 | Accepted: 2 December 2018

DOI: 10.1111/pirs.12418

FULL ARTICLE

Location-specific knowledge in spatial job search and its outcomes: An empirical investigation

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JEL Classification: D83; J31; J61

Abstract

This paper investigates how working location influences jobseekers' subsequent spatial job search. Further, it is assessed to what extent mobility between working regions is associated with wage growth. The results show that the working region functions as a prominent geographical anchor around which the new job search is focused. The jobseekers that do find a job far away from their old working region receive a small wage premium, but this premium disappears if selectivity is taken into account. It is concluded that employees demonstrate substantial stickiness to their working locations, and that this is motivated by asymmetry in search costs. No evidence was found that mobility between working regions in itself affects wages.

KEYWORDS

commuting, job search, localized learning, spatial mobility, wage growth

1 | INTRODUCTION

Spatial job search behaviour and its pecuniary outcomes could be expected to be affected by the use of location-specific knowledge accumulated in the old working location as well as by location-specific knowledge and housing considerations pertaining to the location of residence. This paper investigates the relative importance of both locations on a jobseeker's choice for a new working region, and how the mobility between working regions is associated with wage development. By analysing a specific set of long-distance commuters, I am able to separate the influence of location-specific knowledge accumulated in the previous working location from the factors relating to the place of residence.

The idea that there is a location-specific component to knowledge, and that therefore employees' productivity (and supposedly also their wages) is influenced by the working location has been expressed by several authors. For instance, Boschma, Eriksson, and Lindgren (2009) argue that the labour inflows that contribute most to a plant's productivity are those that are related to, but not similar to, a plant's knowledge base along geographical and industry dimensions (for similar studies, see also Eriksson, 2011; Östbring & Lindgren, 2013; Timmermans & Boschma, 2013). Simonen and McCann (2010) argue that geographically mobile employees are important knowledge transmitters. Also, with regard to knowledge flows more generally, several studies stress the importance of the geographical position of the knowledge source. Bathelt, Malmberg, and Maskell (2004) describe different knowledge exchange regimes—local buzz and global pipelines—depending on where the knowledge exchanging partners are located. However, despite the extensive attention paid to the spatial component of productivity, there is a lack of research into why and how job matches over various distances are made. This is relevant since a better understanding of the mechanisms underlying job matching in space could help policy-makers devise measures that facilitate the creation of productive matches. Consequently, this paper sheds light on employees' perspective on how the spatial job search is conducted.

The empirical approach of the paper aims to differentiate between jobseekers' considerations pertaining to their working and their residential locations. A crucial condition is thus to separate the residential and work location so that their respective influence on job search progresses can be disentangled. To do so, the paper focuses on job switches that involve individuals who initially have lengthy commutes (over 50 km) and switch jobs while their residential location remains unchanged. As such, employees do not incur relocation costs and the change in commuting distance can be controlled for. As the residential and the old working locations are distinct, I can differentiate between the proximity of the new job to the residential location and to the old working location. The rationale for that is as follows. Arguably, both working location and residential location influence job search geography. People prefer jobs close to their residential location due to shorter commutes. In addition, residential locations are the focal points of social networks that often play a role in job search. Work locations are the centres of professional networks that might facilitate a smooth transition to another local job. Also, people learn about the local *modus operandi* in their working locations. It is quite possible that the value of such knowledge depends on the location of the new job.

As far as I am aware, this study is the first to make the distinction between residential and working locations. Many labour force mobility studies focus on jobseekers' willingness to migrate and on the wage growth associated with migration. Migration refers to changing residential regions, but long-distance migration has also been viewed as equivalent to switching regional labour markets. Such migration studies incorporate labour market dynamics, related to changing regional labour market, alongside housing dynamics and social networks related to changing residential region. In comparison to these studies, the mechanism underlying wage developments—changes in the regional labour market—is identified more directly in this paper. Further, the approach used in this paper enables me to focus solely on job search and to separate this from social networks and housing considerations.

Understanding job search geography independently from considerations pertaining to residential location provides a new perspective on a range of aggregate labour market phenomena, such as regional wage and unemployment disparities and spatial mismatches. As such, it is relevant to many policy areas relating to spatial mobility: labour markets, real estate, traffic and public transport, and regional cohesion policies.

The remainder of the paper is structured as follows. In the next section, I discuss how proximity between working regions influences job match productivity and the attractiveness of the new working location to employees. Then, in Section 3, the empirical strategy is presented, followed by the data and models used in Section 4. Next, Section 5 discusses the results before conclusions are drawn in Section 6.

2 | JOB MATCHING IN SPACE

Job search models typically posit that a jobseeker incurs fixed search costs and receives job offers with wages from a known distribution (McCall, 1970). This paper argues that the wage distributions from which offers to a particular

jobseeker are drawn could vary across locations. Also, receiving job offers could require different levels of search intensity in different regional labour markets, even for otherwise similar vacancies. I argue that both the search costs and the resulting wages will to an extent depend on the proximity of the old and the new working regions.

Earlier work has demonstrated substantial heterogeneity of local labour markets in terms of working culture, production techniques, skill used and business practices. For instance, Aoyama (2009) shows in a case study on information technology entrepreneurship in the Hamamatsu and Kyoto regions in Japan how everyday working practices are affected by different historical legacy and lead firms in the two regions. Rosenkopf and Almeida (2003) demonstrate using patent citation data that technological knowledge transmission is geographically restricted. Rigby and Essletzbichler (2006) document significant spatial differences in the production techniques that manufacturing industries in the US employ with so signs of convergence over time. Depending on the working location people therefore build up different knowledge: they accumulate the technical knowledge required by the local routines, gain the ability to operate in the local context and build up local networks. This is in this paper referred to as location-specific knowledge.

Such local knowledge might be a valuable resource. Employees with this knowledge are well adjusted to function in the local context. Indeed, the benefits of possessing local knowledge have been demonstrated in several contexts other than paid employment: local buyers pay less for real estate (Ihlanfeldt & Mayock, 2012; Lambson, McQueen, & Slade, 2004); local entrepreneurs' ventures perform better (Dahl & Sorenson, 2012).

On the other hand, overreliance on local knowledge leads to lock-ins (Grabher, 1993). Innovation literature stresses that in order to innovate firms need knowledge that is somewhat, albeit not radically, different from their own knowledge base (Nooteboom, van Haverbeke, Duysters, Gilsing, & van den Oord, 2007). Employees that have gained much of their working experience locally know all the ins and outs, yet they are unable to challenge the local practices, add to the local knowledge base and they lack external orientation (Maskell & Malmberg, 2007). Several studies demonstrate empirically that labour force mobility is a valuable knowledge transfer mechanism (Boschma et al., 2009; Horta, Veloso, & Grediaga, 2010; Simonen & McCann, 2010). If this non-local knowledge is valued at a premium by employers, it could command a higher wage. For instance, Falck, Lameli, and Ruhose (2016) demonstrated that workers receive a wage premium for migrating to culturally different regions, though they interpreted it as compensation being given for overcoming cultural dissimilarity rather than as a premium for bringing valuable fresh knowledge.

Further, not only wages but also search costs may be affected by location-specific knowledge. Employees develop local networks in the regions where they work and, through those networks, they might be directly offered jobs or they might be provided with information about job opportunities. As a result, local jobseekers put less effort into identifying suitable jobs and they are likely to face less thorough screening procedures as their credentials are easier to establish. They can also obtain better information about the fit of a potential job match, which helps them to optimize their search efforts (see Devillanova, 2013; Dustman, Glitz, Schönberg, & Brücker, 2016). This is corroborated by empirical evidence showing, from both firms' and employees' perspectives, that professional and social networks with limited geographical reach are used extensively in establishing job matches (see Ioannides & Loury, 2004 and Topa, 2011 for reviews). This asymmetry in search costs creates incentives for employees to look for jobs close to their old working location.

I argue that jobseekers weigh the anticipated wages against the anticipated costs of finding a job when determining their geographical job search reach. As such, this paper follows the approach laid out in the landmark paper by Sjaastad (1962) in seeing spatial job search as repeatedly weighing the costs relating to finding a job in a certain region against the returns.

To conclude, I suggest that the value of the knowledge accumulated in the old working region varies depending on the proximity of the old and the new working regions. The effects on wages of the relative proximity of the working regions could be both positive and negative, and how the net effect is established empirically is discussed in the next section. Further, I argue that jobseekers make decisions relating to mobility between working regions by balancing considerations relating to wages and to search costs. Job search costs are expected to be lower for jobs close to the old working region, and this will increase their attractiveness to jobseekers.

3 | EMPIRICAL STRATEGY

Based on the observations made in the previous section, the following framework is proposed to examine spatial job search behaviour and its pecuniary outcomes. A jobseeker's choice of working region is determined by balancing the expected costs and the expected returns (wages) of finding a job in the various regions. Jobseekers are expected to incur lower search costs in regions close to their old job region, which shifts the likely choice towards continuing to work close to the same region. However, wages may be higher, or lower, in more distant regions due to similarity or differences between employers' and employees' knowledge. To the extent that the associated effects on wages are anticipated by jobseekers, similarities in location-specific knowledge could provide jobseekers with either incentives or disincentives to remain close to the same working region.

It is, however, important to consider several factors unrelated to location-specific knowledge that could also influence job search in space and it outcomes. For instance, if the old working region has not been chosen randomly but because it had ample good job opportunities, it could still continue to provide such opportunities. On the other hand, broadening the geographical search reach to include regions with higher search costs could also improve the job match due to having more job options to choose from. In addition, the effects on wages of proximity between working regions could be influenced by regional differences. Regardless of proximity, some regions offer more well-paying job opportunities than others.

The effects of similarity between employers' and employees' location-specific knowledge are also expected to be reflected in the observed wage developments. However, if the proximity between working regions affects not only wages but also search costs, distant job matches might be realized selectively. Wages observed in regions that are far from an employee's old working region can be expected to be higher as employees will only extend their geographical job search reach if they expect the wages to compensate for higher search costs. Job switchers that demonstrate mobility between working regions can thus be expected to be a selective group that anticipate relatively low search costs and/or relatively high returns with greater distance. This self-selection needs to be taken into account when obtaining estimates that apply to the general population rather than to this selective group.

Based on the above intuition, the empirical analysis has two main focuses. The first focus is on the effect of proximity between the old and the new working regions on general jobseekers' utility, as reflected in their choices with regard to geographical job search. The second focus is on labour market outcomes, as reflected in wage developments.[1] Two aims of spatial mobility—improving labour market outcomes regardless of the costs incurred by the jobseekers, and increasing personal utility expressed as the sum of all monetary and psychic costs and returns—are prominent in migration research, although their treatment is not consistent. In his landmark paper, Sjaastad (1962) criticized the prevailing economic thinking of the time that saw migration only in terms of labour market outcomes. According to the then contemporary thinking, people respond to regional wage differentials by migrating, which results in regions converging. In contrast, Sjaastad argued that other considerations also enter the spatial mobility decision: that people weigh migration costs against benefits, and they might not be willing to accept better paying faraway jobs due to monetary and psychic costs relating to spatial mobility. As such, migration decisions maximize utility that is influenced, but not exclusively determined, by wages. On the individual level, higher post-migration wages can to an extent be offset by relocation costs.

Many empirical studies that estimate the pecuniary returns to migration do acknowledge that migration is associated with costs, but nevertheless focus only on its returns because appropriate cost variables are difficult to find. In order to estimate the causal migration effects on wages, these studies use variables such as home ownership or housing tenure (Devillanova, 2013; Zaiceva, 2006) as instrumental variables for migration, arguing that migration costs are higher for some people and they are therefore less likely to migrate. The reasoning is thus that although certain

[1]As empirical measurement of different aspects of knowledge remains elusive, similar reasoning has been previously used in the existing literature to indirectly infer about concepts such as industry-specific or occupation- specific human capital: Neffke and Henning (2013) examine the job switching behaviour of employees, Neal (1995), Kambourov and Manovskii (2009) and Sullivan (2010) study the wage growth associated with different job switches.

spatial mobility choices are better in terms of wages, only those jobseekers that expect the higher wages to offset relocation costs will commit to them.

This paper is explicitly interested in both the labour market outcomes and the decision-making of jobseekers in response to perceived opportunities and restraints. Further, it focuses on mobility between regional labour markets that does not involve a change in residence. In most migration studies, the most important explanation for a migration premium, including when instrumental variable approaches are applied, can be expected to be selectivity related to relocation costs. Jobseekers set the reservation wage higher for jobs farther away in order to compensate for relocation costs, although the required compensation may depend on individual characteristics, such as home ownership or risk aversion. In contrast, this paper focuses primarily on the role of similarity in location-specific knowledge in job matching. As such, selectivity arising from relocation costs is not expected to influence the job search behaviour of the selected group. In its approach, the paper relates to several studies considering the informational aspects of spatial job search (Demiralp, 2009; Farber, 1983; Gibbs, 1994; Yezer & Thurston, 1976) and human capital transferability (Krupka, 2009).

The paper focuses on job search where a change in residential location is not involved. Consequently, people do not incur relocation costs and the change in commuting distance can be controlled for. The analysis focuses on people that already had long commutes to their old jobs, with 50 kilometres set as the lower threshold. 50 km is a long commute in the Dutch context where an average commute is 24 km (Statistics Netherlands, 2016). Choosing 50 km as the threshold ensures that the residential and working environments are sufficiently different and the networks and local knowledge accumulated in both locations do not overlap, and so I can differentiate between proximity of the new job to the residential location and to the old working location. As such, the effects of location-specific knowledge accumulated in the working location can be separated from that accumulated in the residential location and from commuting considerations. This distinction between working and residential locations is novel in the literature on spatial mobility. In the existing literature, working and residential locations are often assumed to be coincident, with migration often treated as an outcome of job search in space (e.g., Yankow, 2003).

The suggested research design is facilitated by the richness of the data and by the research context: the Netherlands is a densely and fairly uniformly populated country. There are many population centres close to each other, and so there are many possibilities for picking and mixing residential and working locations. The chosen distance threshold gives job seekers a sufficient number of viable new job location options in between the residential and the old working location in order to tease out the geographical patterns of job search (Figure 1).

All the above considerations lead to the following research strategy. In the empirical analysis, I include only those job switches that were conducted in 2012 by people who stayed in the same residential municipality and who, prior to the job transition, were commuting more than 50 kilometres to work. First, I examine how the choice of a new working region is influenced by proximity to the old working region. People could be expected to choose to work in regions that offer ample opportunities for high-paying jobs and that are close to their residence. The distinction made between proximity to the residential location and proximity to the old working location enables me to estimate whether regions close to the old working region are more likely to be selected. The extent to which regions close to the old working regions are preferred to regions farther away will reveal to what extent finding a job in such regions is more attractive because of lower anticipated search costs and/or higher expected wages.

To examine the pecuniary returns to mobility between working regions, wage growth is regressed on the distance between the old and the new working regions. In the analysis, I control for personal and regional characteristics. Further, selectivity is accounted for since it could be expected that jobseekers demonstrating mobility between working regions are those that have decided that a greater job search reach is justified after weighing the anticipated search costs and potential wages. Therefore, selectivity is viewed as being dependent on a set of variables that capture the differences in the costs and returns of geographically broad job search. This set of variables includes regional characteristics since people that initially work in regions with fewer and less-well paid employment opportunities have more to gain from changing their working region. Further, people that work farther away from their residential location might be more motivated to change working region in order to decrease their commuting.

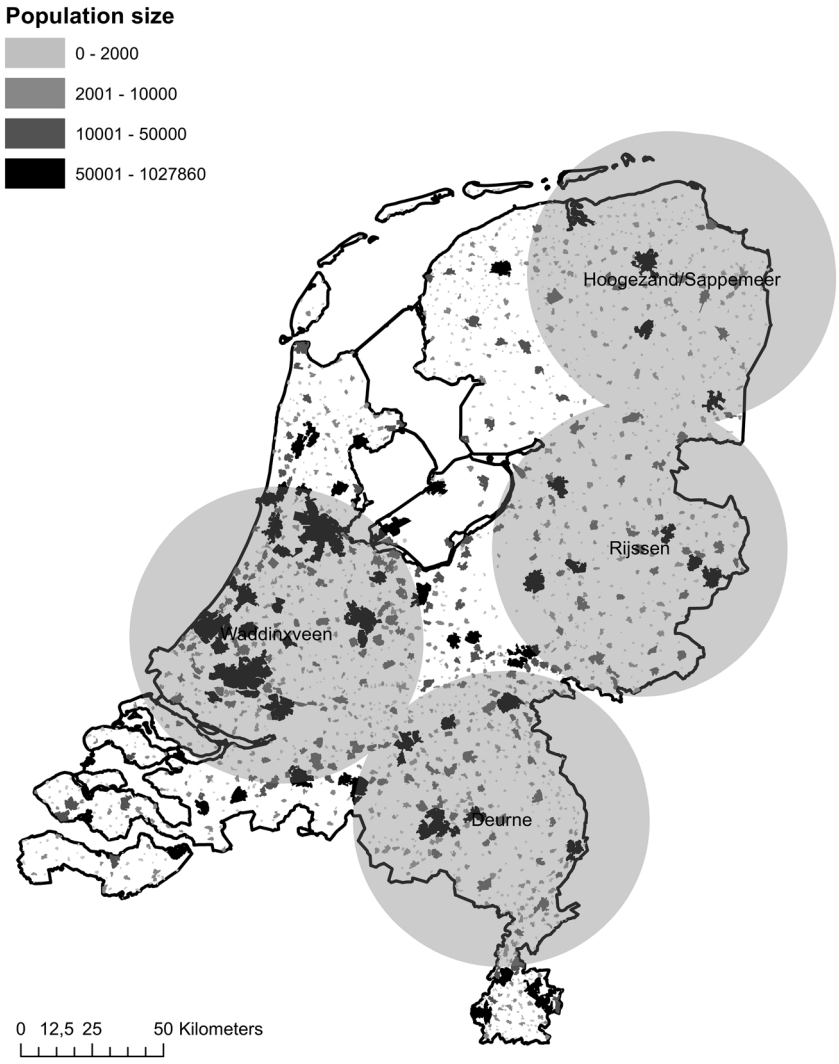

FIGURE 1 The geographical spread of population centres in the Netherlands in, 2011 (for definitions and methodology refer to Statistics Netherlands, 2014). To illustrate the residential and working location matching options for people willing to accept long commutes, circles with a radius of 50 kilometres are drawn around several population centres in different parts of the Netherlands: Hoogezand-Sappemeer, Rijssen, Waddinxveen and Deurne

In addition, personal characteristics that predict wage growth are also included as predictors for selecting into mobility between working regions since it can be expected that these also reflect the importance of finding a good job match for wage development. In addition, people that have not worked in their old working region for long can be expected to have accumulated less local knowledge and therefore to face search costs that are less asymmetric between jobs near and far from their present working location. Further, the wage component attributable to similarity in location-specific knowledge is expected to be less asymmetric for people with a short tenure in the old working region.

This paper is primarily interested in individual considerations pertaining to similarity in location-specific knowledge rather than in whether regional differences are a motivation for changing working regions and a source of wage growth for mobile employees. However, since there will be regional variation in job opportunities, regional characteristics are controlled for. In the next section, the data and variables used in implementing this empirical strategy are presented.

4 | DATA AND MODELS

The analyses use rich data provided by Statistics Netherlands. This enables me to trace individuals' employment histories along with wages and working locations. People can also be linked to their residential locations. Job changes in 2012 are examined, and data from the years between 2006 and 2013 are used to calculate variables used in the regressions as well as selection criteria.

To facilitate the separation of residential and work location effects, the following selection criteria were used. First, only individuals were selected who were employed on 31 December in both, 2011 and 2012. Further, both jobs had to be full time (defined as at least 120 hours worked in December) and these had to be the only jobs held at the time. This set of criteria resulted in 3.4 million observations. Then I further limited the sample to those individuals whose commute to work was more than 50 kilometres on 31 December, 2011.[2] Further, I removed individuals whose residential location on 31 December, 2013 was different from that on the same date in, 2011. This reduced the sample size to 224,012 cases.

In order to be able to assign working locations unambiguously, I only included people who worked in single-plant firms on the 31 December of both 2011 and 2012. Only for employees of single-plant firms the working locations are directly observed rather than imputed. I also wanted to exclude people whose long commutes were facilitated by the type of work conducted in the firm. For instance, if employees worked for organizations where flexible working arrangements were prevalent, or where the actual work was likely to be performed elsewhere than the firm's location (such as with consultants and construction workers), the employees would not be expected to accumulate much knowledge specific to the firm's location. Therefore, I only selected people with initial long commutes if such commutes are not prevalent in their firms. The threshold is set such that employees are selected if the median commuting distance in the firm is less than 25 kilometres. After applying these criteria and excluding any observations where wages were negative or zero, 52,278 cases were left. For most of the empirical analyses, I further narrow down the selection to 4,436 individuals that had changed jobs during 2012. While the selection criteria substantially reduce the sample size, they also allow me to identify the group of interest very accurately.

The following empirical analyses are performed on the sample. First, a conditional logit approach is employed to examine factors that determine the choice of working region. Every job switcher has in effect chosen a new working region from the 408 municipalities (NUTS 4 regions) that existed in the Netherlands as of 1 January, 2013. Municipalities are the smallest administrative units in the Netherlands with median population of 25,600 in, 2013. Operationalizing the residential/working locations at this fairly small geographical level allows us to model the spatial relationships with precision.

This new working region might coincide with the old working region or with the residential region, or neither. This generates 1,809,888 observations (4,436 job switchers each with 408 options) with the dependent variable indicating whether the specific region has been chosen by the job switcher. As only one region is chosen by each job switcher, the dependent variable equals zero in 407/408 of the cases. Such situations, with many alternatives, are widely addressed using discrete choice modelling (Train, 2007). Further, modelling migration destination as a choice from many available regions is common in migration research (Dahl & Sorenson, 2010; Davies, Greenwood, & Li, 2001; O'Keefe, 2004; Schneider & Kubis, 2010).

Job switchers could be expected to prefer regions that are close to their residential locations. By choosing to work in regions close to home, they will benefit from shorter commutes and possibly also from being able to apply their knowledge accumulated in the residential location. After controlling for the distance from the new job location to the residential location, I would expect to find an independent effect for the distance to the previous working location. This effect will capture the perceived influence of location-specific knowledge, accumulated in the working

[2]Please note that the sample is substantially reduced by selecting the employees with commutes in excess of 50 kilometres. Although a willingness to accept such commutes potentially provides numerous geographically spread job opportunities (see Figure 1), such commutes are uncommon in the Dutch context. Among people who switched between full-time jobs in 2012, only 7.4% had commutes of 50 kilometres or more in their old job.

region, on search costs and wages. In addition, regional characteristics could influence job switchers' choice. Job switchers could be expected to prefer to seek work in regions with high population densities, high wages, and a strong presence of the industry in which they previously worked because this will increase the likelihood of a good job match.

A conditional logit analysis is performed with different functional forms of the distance variables. For instance, it could be expected that differences in distance matter less for the furthest working regions. In order to address the expected non-linearity of distance effects, one specification uses a natural logarithm transformation of the distance variables. It is also plausible that the effects of local knowledge accumulated in the old working location can be very localized. Similarly, very short commuting distances might be qualitatively different, for instance because they might allow switching to a different transport mode. To capture this, dummy variables are included reflecting whether the new working region is the same as either the old working region or the residential region.

In a second analysis, the effects of spatial mobility on wage growth is examined. First, an OLS regression is performed with the distance between working regions treated in turn as a continuous or ordinal variable. OLS results demonstrate the effects of switching working regions on wage when the selectivity pertaining to switching residential locations is eliminated. Also, the regional characteristics potentially of influence on between-job wage growth are controlled for. The effect of distance between working locations therefore pertains solely to the location-specificity of knowledge.

Yet, as previously hypothesized, the proximity between working locations could affect not only the wages but also the search costs. Individuals with less local knowledge might find it relatively easier to engage into distant job search. Therefore inverse-probability-weighted regression adjustment is made to account for selectivity into different categories of distance between working regions (Stata: treatment effects). As the jobseekers will only undertake a distant job search, and subsequently accept a job far away from their old working region, if they anticipate this far-reaching job search to incur relatively low search costs and result in relatively high returns, the OLS estimates of the distance between working regions are therefore expected to be adjusted downwards after taking selectivity into account.

Inverse-probability-weighting assigns observations weights in order to make groups selecting into different treatment statuses comparable along specified background characteristics. The weights are used to calculate corrected regression coefficients, which are then used to carry out a regression adjustment. In this regression adjustment, the treatment effects are calculated by comparing the observed outcomes with the counterfactuals. The counterfactuals are understood to be predictions derived from the background characteristics.

The model controls for change in commuting distance. This is important as distance to home region is expected to affect wages in several ways. Wages could be affected not only by the similarity between a firm's knowledge and an employee's knowledge accumulated in the working location, but also by similarity between the firm's knowledge and an employee's knowledge accumulated in the home location. In addition, it is plausible that employees selectively only accept distant jobs if they are better paid than the jobs close by. Other control variables in the wage regression model include personal characteristics such as initial wage, gender, age, tenure in the old job, and regional characteristics, such as working age population density, median wage, and location quotient. The following variables are intended to capture the spatial asymmetry in search costs and returns, and consequently to affect selection into treatment: personal characteristics such as initial commuting distance, initial wage, gender, age, duration of employment in the old working region and regional characteristics, such as working age population density, median wage and location quotient. The operationalization of the variables is presented in greater detail in Table 1.

5 | RESULTS

In this section, some descriptive findings pertaining to job search strategies are first shown and discussed (the descriptive statistics are also presented in more detail in the Appendix). Following this, the results of the analyses outlined in the previous sections are presented.

TABLE 1 The operationalization of variables used in the regressions

Variable	Description
REGSELECTED	A binary variable indicating whether the NUTS-4 region has been selected as the new working region.
CHANGEWAGE	The difference between the natural logarithms of wages on 31 December 2011 and on 31 December 2012.
DISTWORKREG	The distance in hundreds of kilometres ('as the crow flies') between the old and new working regions, measured at NUTS-4 region level.
COMDIST	Commuting distance ('as the crow flies') on 31 December 2011, measured in hundreds of kilometres.
CHANGECOMDIST	The difference between the commuting distances, measured in hundreds of kilometres. Both commuting distances are measured from the residential location, first to the location of the job held on 31 December 2011, then to the location of the job held on 31 December 2012. A positive distance indicates the new job is farther from home
WAGE	Natural logarithm of wage in December 2011.
GENDER	Male/female
AGE	Age in years
TENUREFIRM	Tenure with the old employer. TENURE is censored due to employment histories only being available for a limited number of years. For this reason, tenure is coded into ordinal categories with the final category representing tenures of five years and above. 0: Worked for the same employer for less than one year. 1: Worked for the same employer for at least one but less than two years. 2: Worked for the same employer for at least two but less than three years. 3: Worked for the same employer for at least three but less than four years. 4: Worked for the same employer for at least four but less than five years 5: Worked for the same employer for at least five years.
DURWORKREG	Working period in the old working region. All jobs with a known location as of 31 December in any of the years 2006–2011 are considered. DURWORKREG is censored just like TENUREFIRM and is coded using similar categories.
REGPOPDENS/ REGOPODENSNEW	Working age (15–65) population density in the old/new working region on 31 December 2011, in thousands of inhabitants per square kilometre.
REGWAGE/ REGWAGENEW	Median hourly wage in the old/new working regions as of December 2011. The median is calculated based on the wages of all full-time employees with only one job.
LQ/LQNEW	Location quotient of the old job industry measured at the 2-digit level of NACE rev. 2 in the old/new working regions as of 31 December 2010.
UNEMPL	Unemployment rate in the old working region.

Job switchers in this sample experienced more rapid wage growth than employees that remained in the same job (mean wage growth equals 0.09 for job switchers and 0.04 for stayers). This suggests that job switching is predominantly motivated by exploring new opportunities rather than by necessity. In the following analyses, I focus exclusively on the job switchers. A substantial proportion of them (26.6%) continued to work within the same NUTS 4 region. This propensity to stay increases with the duration of working in a region, suggesting that people become increasingly reluctant to leave as they accumulate local knowledge (Figure 2).

However, those who do switch working regions often make fairly large spatial adjustments with the median distance between the old and new working locations being 55.0 kilometres. Those who switch working regions generally decrease their initially long commutes. The median decrease in commuting distance was 33.2 kilometres for the whole sample and 50.4 kilometres for those changing working region. This suggests that the search for a new job tends to focus around either the residential or the old working location. The choice made by individuals with initially long commutes to focus their new job search on either their residential location or their old job location is further confirmed by the strong negative correlation between the distance between working locations and the increase in commuting distance (correlation coefficient − 0.64, $p < 0.001$): the farther a new job is from the old job, the more

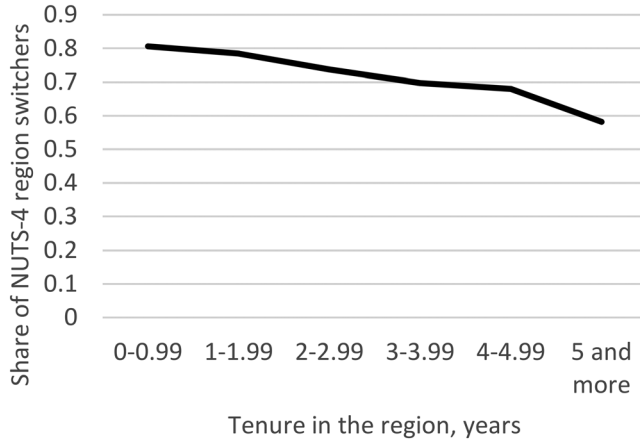

FIGURE 2 Proportion of region switchers depending on the tenure in the region

TABLE 2 The results of the conditional logit model on the choice of a new working region

	Dep. Var. = REGESLECTED odds ratios	Dep. Var. = REGESLECTED odds ratios
	(1)	(2)
DISTWORKREG	0.384*** (0.029)	
Dummy: DISTWORKREG>0 (new working region does not coincide with the old working region)	0.015*** (0.001)	
DISTWORKREG, natural logarithm		0.647*** (0.002)
COMDIST	0.045*** (0.004)	
Dummy: COMDIST>0 (new working region does not coincide with the residential region)	0.079*** (0.005)	
COMDIST, natural logarithm		0.643*** (0.002)
REGWAGENEW	1.180*** (0.014)	1.169*** (0.013)
REGPOPDENSNEW	1.609*** (0.029)	1.488*** (0.026)
LQNEW	1.020*** (0.002)	1.020*** (0.001)
Observations	1,809,888	1,809,888
McFadden's pseudo R squared	0.3858	0.3577

Notes: Robust standard errors in parentheses. ***$p < 0.01$.

Individual fixed effects are included.

it brings the jobseeker closer to home. This indicates that, as anticipated, jobseekers are driven by distinct residential location and working location considerations.[3]

Table 2 presents the results of a conditional logit model predicting the new working region from the 408 Dutch municipalities (NUTS 4 regions). The results show how the expected costs and returns relating to mobility between working regions influence the choice of working region. The distinction between residential and working locations allows me to separately identify the effects of distances to the residential location and to the old working location

[3]The following relationship exists between the distance between the old and new working regions and the change in commuting distance. The distance between the job locations equals the maximum increase or decrease in commuting distance, and this value will only be achieved if the residential location, the old and the new working locations are on a straight line. Although the distribution of the changes in commuting distance is restricted relative to the distance between jobs, there is considerable variation within these restraints depending on the relative bearings of the two jobs from the residential location.

on the subsequent choice of working location. Regressions with different functional forms of the distance variables were tested, and only the best performing specifications are reported.

Column (1) in Table 2 presents a specification with non-transformed distance variables DISTWORKREG and COMDIST and with dummy variables indicating whether the job switcher's new job is outside the old job's region (DISTWORKREG >0) and/or outside the unchanged residential region (COMDIST >0). Including these dummy variables allows the home region and the old working region to influence the spatial job search differently on a small geographical scale. The odds ratios for the distance dummy variables are both substantially below one and statistically significant, indicating that job seekers prefer to either stay working in the same region or to find a job in their residential region. Even those who do switch regions have a preference for staying close to their old working region and/or residential region (the odds ratios for DISTWORKREG and COMDIST are again both below one and statistically significant). Of the two dummy distance variables, the working region change dummy has the stronger effect.

TABLE 3 The results of regressions on wage growth

	Dep. Var. = CHANGEWAGE		
	OLS	OLS	Treatment effects
	(1)	(2)	(3)
DISTWORKREG	0.029* (0.013)		
Dummy: 25 km < = DISTWORKREG<50 km (DISTWORKREG <25 km is the reference category)		0.002 (0.018)	−0.075 (0.054)
Dummy: 50 km < = DISTWORKREG<75 km		0.014 (0.015)	−0.000 (0.054)
Dummy: 75 km < = DISTWORKREG<100 km		0.025 (0.017)	0.009 (0.073)
Dummy: 100 km < = DISTWORKREG<125 km		0.021 (0.023)	−0.107 (0.078)
Dummy: 125 km < = DISTWORKREG<150 km		0.061* (0.028)	0.021 (0.114)
DISTWORKREG > = 150 km		0.037 (0.024)	−0.021 (0.224)
CHANGECOMDIST	0.070*** (0.013)	0.069*** (0.013)	
WAGE	−1.152*** (0.069)	−1.153*** (0.069)	
WAGE x WAGE	0.128*** (0.012)	0.128*** (0.012)	
GENDER = woman	−0.006 (0.013)	−0.006 (0.013)	
AGE	0.043*** (0.005)	0.043*** (0.005)	
AGE x AGE	−0.000*** (0.000)	−0.001*** (0.000)	
TENUREFIRM = 1 (0 is the reference category)	0.058*** (0.012)	0.057*** (0.012)	
TENUREFIRM = 2	0.059*** (0.017)	0.059*** (0.017)	
TENUREFIRM = 3	0.072*** (0.020)	0.071*** (0.020)	
TENUREFIRM = 4	0.085*** (0.020)	0.085*** (0.020)	
TENUREFIRM = 5	0.062*** (0.015)	0.061*** (0.015)	
REGWAGE	0.078* (0.041)	0.077* (0.041)	
REGPOPDENS	0.002 (0.009)	0.003 (0.009)	
LQ	0.001 (0.001)	0.001* (0.001)	
REGWAGENEW	0.080* (0.041)	0.079* (0.014)	
REGPOPDENSNEW	0.021* (0.010)	0.022* (0.010)	
LQNEW	0.000 (0.001)	−0.000 (0.001)	
REGWAGE x REGWAGENEW	−0.004* (0.002)	−0.004* (0.002)	
REGPOPDENS x REGPOPDENSNEW	−0.003 (0.004)	−0.003 (0.004)	
LQ x LQNEW	0.000 (0.000)	−0.000 (0.000)	
Observations	4,436	4,436	4,436
R squared	0.4675	0.4677	

Notes: Robust standard errors in parentheses. ***p < 00.1, *p < 0.05, *p < 0.1.

However, of the two continuous distance variables, commuting distance has the stronger effect. This suggests that the anchoring effect of the old working region is more localized than that of the residential region.

Column (2) in Table 2 shows the results of a specification with a natural logarithm transformation of the distance variables. Using the natural logarithms is another way to attach greater weight to differences in distances at the lower end of the distance distribution in order to reflect the expectation that, for instance, the difference between 5 and 10 kilometres matters more than the difference between 50 and 55 kilometres. Again, the odds ratios are substantially below one and statistically significant for both the commuting distance variable and the distance between working regions variable. This indicates that jobs in regions close to the old working region and/or close to the residential region are seen as more favourable, after weighing their expected costs and returns. The anchoring effects of the old working region and of the residential region are similar in magnitude: the odds ratios are 0.647 and 0.643 respectively. Further, in line with expectations, job seekers are more likely to switch to jobs in regions with high population densities, high wages, and high concentrations of jobs in the industry they were working in.

Table 3 demonstrates how wage growth is influenced by mobility between working regions. Columns (1) and (2) show the results of OLS regressions with distance between working regions measured as continuous and ordinal variables respectively. As in column (2), column (3) presents the effects of categories of distance on wage growth but, here, the selectivity into distance bands is additionally controlled for. Inverse-probability-weighted regression adjustment and regression adjustment is used to account for the selectivity into mobility between working regions. Note that only the effects of the main distance variable are demonstrated in column (3), whereas Table 4 includes full treatment assignment and outcome regressions.

First, looking at the results in column (1) of Table 3, we see that the distance between the old and the new working locations has a positive statistically significant effect in the OLS regression. This indicates that job seekers taking jobs that are farther away from their old jobs receive a wage premium after controlling for regional differences and for the change in commuting distance. However, the effect is quite modest: every ten kilometres of distance between jobs is associated with a 0.0029 difference in the natural logarithms of wage. This equates to approximately a 0.29% greater increase in wages. I also tested whether the effects of distance between jobs were non-linear but found no evidence for this (see Table A3, columns (2)–(3) in the Appendix).

Wage growth is influenced not only by the distance between working regions in itself but also by the change in commuting distance that accompanies it. To isolate the effect of the distance between working regions, I control for the change in commuting distance. I find that increase in commuting distance is positively, and statistically significantly, associated with wage growth. Two mechanisms could be expected to contribute to this result. First, the effect could reflect the trade-off between commuting distance and wage: job seekers could set higher reservation wages for distant jobs to compensate for the increased commuting costs. Second, jobseekers could also accumulate local knowledge in their residential region, due to which the proximity of the new job to the residential region could be expected to influence wages both directly and indirectly through the selectivity resulting from different search costs.

Looking at the control variables, it can be observed that the effects of the wage in the old job are non-linear: at the lower end of the wage distribution, higher wages are associated with lower wage growth but, at the higher end of the wage distribution, the opposite holds true. Alongside wage as a proxy for one's skill level, education level could also be expected to influence wage development. Yet education was excluded from the main specification due to there being many missing values, especially for the older workers. However, I also ran a regression on a smaller sample made up of those whose education level was present, and this showed that highly educated employees tend to experience more rapid wage growth (see Table A3, column (1) in the Appendix). Notably, the findings relating to spatial relationships remain robust regardless of how skill level is operationalized.

Returning to column (1) of Table 3, we see that gender has no statistically significant effect on wage growth. In terms of age effects, wage growth initially increases with age but this effect reverses in one's early forties. Longer tenures in the old firm tend to be associated with greater wage increases on moving to a new job, although the wage increase for those with the longest tenures (5 and more years) is lower than for those with tenures of 3–4 and

4–5 years. Higher wage levels, both in the old and in the new working regions, are linked to higher wage growth (statistically significant at the 0.1 level). The interaction effect between wage levels in the old and in the new working regions is negative and statistically significant at the 0.1 level. This suggests that employees benefit less from finding a job in a high wage region if their previous job was also in a high wage region. Further, employees moving to regions with a high population density experience more wage growth, and the effect is statistically significant at the 0.05 level. Most of the regional variables are only marginally statistically significant or non-significant at any of the conventional significance levels. This lack of statistical significance with the regional variables could be a result of their effects overlapping in that some of the regional variables are highly correlated although tests show an absence of multicollinearity. The regional variables and their interactions are jointly significant at the 0.001 level, which suggests that regional variables do matter. Finally, the main findings remain robust once outliers are excluded.

For consistency, and to allow comparison with the results for treatment effects, OLS regression results are also shown with distance between the working regions treated as an ordinal variable (column (2) of Table 3). In general, the effects on wage growth are stronger for the longer distance categories, although only the category where the distance between the old and the new working regions is between 125 and 150 kilometres is statistically significant at the 0.05 level. The coefficients of the other variables are very much the same, in terms of magnitude and significance, whichever distance specification is used.

Next, I control for selecting into treatment based on observable characteristics by inverse-probability-weighted regression adjustment (Stata: treatment effects). The categories of distance between working locations are approached as a multiple category treatment. I suggest that employees selecting into mobility between working regions are those that expect a broader geographical job search to be associated with relatively low costs and relatively high returns, which can be captured in a number of observable personal and regional characteristics.

The effects of the mobility between working regions treatment are presented in column (3) of Table 3 and can be compared with the OLS estimates in column (2). Table A4 in the Appendix demonstrates the treatment effects in greater detail. In accounting for selectivity, the coefficients for the distance categories between working regions are adjusted downwards and in many cases change the sign from positive to negative, albeit remaining statistically not significant. Further, the lack of a linear trend in the distance category coefficients, after adjusting for selectivity, suggests that the distance between the working regions does not have a linear effect on wage growth.

To summarize, the positive effects on wages of distance between working regions found in the OLS regression disappear when selectivity is controlled for. As the adjusted coefficients are statistically not significant and lack consistency among distance categories, the evidence is insufficient to argue neither for negative nor positive effects of the distance between working regions on wages. However, one should not forget that, when selectivity was adjusted for, this referred to selectivity among employees in that only those anticipating relatively low search costs and/or relatively high returns would engage in distant job search. The estimates obtained refer to the effects of mobility between working regions that an average (in terms of the anticipated costs and returns to mobility between regions) non-self-selected jobseeker could expect. In their individual behaviour, employees can be expected to prefer jobs close-by the old working location due to lower search costs. As such, it is possible that the effects of distance between working regions would be negative if search costs were completely eliminated, but this cannot be shown by the available evidence.

With regard to the main research questions in this paper, it can be concluded that the location of the old job functions as a prominent geographical anchor around which the new job search focuses. This indicates that regions close to the old working regions are seen as attractive in terms of anticipated search costs and wages. The anchoring effect of the old working region is very similar in magnitude to that of the residential region. On first inspection, actual wage growth seems to be higher for those employees willing to seek new employment some distance from their present job, although the effect is quite small. However, no evidence is found for mobility between working regions affecting wage growth in either way after taking into account various characteristics that differ between employees who move various distances. This suggests that, in terms of net effects, the similarity of location-specific knowledge does not influence wage development.

6 | DISCUSSION

These results stand in contrast to numerous migration studies that find positive returns to geographical mobility (e.g., Böheim & Taylor, 2007; Di Cintio & Grassi, 2013; Lehmer & Ludsteck, 2011; Lehmer & Möller, 2008), though there are several exceptions finding no statistically significant effect (Venhorst & Cörvers, 2018; Zaiceva, 2006). The positive returns to geographical mobility in many earlier studies are a result of both residential considerations and mechanisms relating to the geographical dimension of knowledge. The disappearance of positive effects when the residential location is kept constant demonstrates the central role that residential considerations play in geographical mobility decisions.

On the other hand, the findings are in line with many accounts with a variety of empirical approaches demonstrating the significance of the geographical dimension of knowledge. The inclination to stay in the same working region even without monetary incentives found in this paper suggests search costs might be lower in a familiar region. The non-trivial role of the costs of distant job search are in line with Demiralp (2009) finding that better access to distant labour markets information increases the likelihood to migrate. More generally, the findings also in consonance with the research demonstrating how transferring information is spatially restricted (Broekel & Boschma, 2012; Rigby & Essletzbichler, 2006; Rosenkopf & Almeida, 2003). Similarly to the OLS regression findings of higher wages for those staying to work in a familiar region, Gibbs (1994) and Demiralp (2009) find that the quality of information one possesses about the local labour market is associated with better labour market outcomes.

7 | CONCLUSIONS

This paper has examined how the location of job influences a subsequent spatial job search and its pecuniary outcomes. It aims to isolate the effects of present working location on job search geography from the effects of residential location. To achieve this, I focused on a specific group of jobseekers: employees who change jobs, from one in which they commute a considerable distance (over 50 kilometres) but do not change residential location. Both spatial job search choices, determined by anticipated wages and search costs related to proximity to the old working location, and the actual wage developments, related to spatial mobility between the old and new working regions are examined.

It was found that jobseekers tend to take jobs in regions close to their old working region. This indicates that, in terms of the expected costs of finding a job and expected wages, regions close to where one was previously working are seen as more favourable. This preference is quite strong: in determining the choice of new working region, the effects of proximity to the old working region and to the residential region are of similar magnitude. It is possible that this is due to reasons unrelated to location-specific knowledge. For example, if the old working region was initially chosen because it provided better job opportunities, the choice to stay nearby might be because such opportunities have persisted. However, it is unlikely that there are significant regional differences in job opportunities that are not captured by the regional variables used. It is therefore plausible that the choice to stay working in the same region reflects employees' beliefs they their local knowledge is of greater value close to their old working regions.

The empirical analyses focus on the job switches in, 2012, which was still a time of considerable labour market slack in the Netherlands. This could affect both the distant job search costs and returns. Due to thick market externalities, searching might be more costly when the vacancies are scarce and many other people are searching (Saks & Wozniak, 2011). With regard to deciding between local and nonlocal job matches, higher nonlocal search costs might be more easily accepted when unemployment or significant underemployment are realistic alternatives. Also, in the recession time the employers might be struggling to keep the head above water and be less inclined to search for different knowledge. It would therefore be interesting to replicate the analyses in a time of a tight labour market.

I also found, after controlling for the change in the commuting distance and for regional characteristics, that jobseekers who take a job far from their old working region receive a small wage premium. However, after taking into account the selectivity into mobility between working regions based on several observable characteristics, there is no

firm evidence that the distance between the old and the new working regions has an influence on wage growth. It is therefore concluded that distant job matches are not inherently better or worse, controlling for the characteristics of the origin and destination regions. This could mean that location-specific knowledge does not influence wages, or that there are both positive and negative aspects to transferring location-specific knowledge that cancel each other out. Evidence for selectivity was found based on variables that capture the costs and returns of expanding the geographical job search reach. This again indicates that job search costs have a real effect on the geography of job matching.

Thus, combining the findings, the conclusion is that employees demonstrate a substantial stickiness to their working locations. To the extent that their anticipated wages in different regions correspond to the actual wages, this stickiness is explained by search costs rather than by wage considerations. In his landmark paper, Sjaastad (1962) argued that accepting jobs in other locations has associated monetary and psychic costs. His framework helped to explain the failure of migration to eliminate regional wage differences, a failure that could not be explained by the contemporary economic thinking. This paper suggests that employees' mobility between regional labour markets is hindered not only by factors such as housing considerations and social networks, but also by high search costs. Employees are thus geographically embedded not only due to constraints originating from outside the labour market, but also due to the local nature of knowledge itself. This embeddedness of employees in their regional labour markets echoes the findings of Morkutė and Koster (2016) who found that firms are also similarly spatially embedded when searching for human capital.

One finding that has interesting policy implications is that once spatial mismatches emerge, people show relatively little inclination to reduce them by adjusting the working location. This is especially relevant in the current context where spatial mismatches are increasingly common. International literature reports that long commutes, as opposed to residential relocation, gain popularity as a form of employee geographical adjustment (Green, 2004; Hofmeister, 2005). Also in the Netherlands the rise in dual earner households and temporary job contracts makes residential relocation for a job less desirable. In the European context, Dutch youth demonstrate very low willingness to relocate for a job (Eurostat, 2018); at the same time the commuting distances in the Netherlands have been rapidly increasing in the last few decades (KiM Netherlands Institute for Transport Policy Analysis, 2013). As a result workers spend much of their time unproductively on the way between work and home and the infrastructure, such as roads and public transport, is increasingly under stress.

Another question relevant to the policy-makers is whether the stickiness of jobseekers reduces the efficiency in the labour markets. As the findings suggest, mobility between working regions does not inherently result in better job matches when the regional characteristics are controlled for. Thus in the unrealistic scenario of no regional differences the stickiness of jobseekers is of no concern. An interesting question for future research is to explore how this stickiness interacts with regional differences in order to determine to what extent the local orientation of workers threatens efficient job matching.

REFERENCES

Aoyama, Y. (2009). Entrepreneurship and regional culture: The case of Hamamatsu and Kyoto, Japan. *Regional Studies*, *43*, 495–512. https://doi.org/10.1080/00343400902777042

Bathelt, H., Malmberg, A., & Maskell, P. (2004). Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography*, *28*, 31–56. https://doi.org/10.1191/0309132504ph469oa

Böheim, R., & Taylor, M. P. (2007). From the dark end of the street to the bright side of the road? The wage returns to migration in Britain. *Labour Economics*, *14*, 99–117. https://doi.org/10.1016/j.labeco.2005.04.004

Boschma, R., Eriksson, R., & Lindgren, U. (2009). How does labour mobility affect the performance of plants? The importance of relatedness and geographical proximity. *Journal of Economic Geography*, *9*, 169–190.

Broekel, T., & Boschma, R. (2012). Knowledge networks in the Dutch aviation industry: The proximity paradox. *Journal of Economic Geography*, *12*, 409–433. https://doi.org/10.1093/jeg/lbr010

Dahl, M. S., & Sorenson, O. (2010). The migration of technical workers. *Journal of Urban Economics*, *67*, 33–45. https://doi.org/10.1016/j.jue.2009.09.009

Dahl, M. S., & Sorenson, O. (2012). Home sweet home: Entrepreneurs' location choices and the performance of their ventures. *Management Science*, *58*, 1059–1071. https://doi.org/10.1287/mnsc.1110.1476

Davies, P. S., Greenwood, M. J., & Li, H. (2001). A conditional logit approach to U.S. state-to-state migration. *Journal of Regional Science*, *41*, 337–360. https://doi.org/10.1111/0022-4146.00220

Demiralp, B. (2009). The impact of information on migration outcomes. MPRA Working paper No 16121.

Devillanova, C. (2013). Over-education and spatial flexibility: New evidence from Italian survey data. *Papers in Regional Science*, *92*, 445–464.

Di Cintio, M., & Grassi, E. (2013). Internal migration and wages of Italian university graduates. *Papers in Regional Science*, *92*, 119–140.

Dustman, C., Glitz, A., Schönberg, U., & Brücker, H. (2016). Referral-based job search networks. *The Review of Economic Studies*, *83*, 514–546. https://doi.org/10.1093/restud/rdv045

Eriksson, R. H. (2011). Localized spillovers and knowledge flows: How does proximity influence the performance of plants? *Economic Geography*, *87*, 127–152. https://doi.org/10.1111/j.1944-8287.2011.01112.x

Eurostat (2018). Half of unemployed young people in the EU ready to relocate for a job. URL: http://ec.europa.eu/eurostat/documents/2995521/8768233/3-27032018-AP-EN.pdf/3a8861db-939c-4790-a3bc-8837bbbac15c

Falck, O., Lameli, A., & Ruhose, J. (2016). Cultural biases in migration: Estimating non-monetary migration costs. *Papers in Regional Science*, *97*, 411–438. https://doi.org/10.1111/pirs.12243

Farber, S. C. (1983). Post-migration earnings profiles: An application of human capital and job search models. *Southern Economic Journal*, *49*, 693–705. https://doi.org/10.2307/1058710

Gibbs, R. M. (1994). The information effects of origin on migrants' job search behavior. *Journal of Regional Science*, *34*, 163–178. https://doi.org/10.1111/j.1467-9787.1994.tb00861.x

Grabher, G. (1993). The weakness of strong ties: The lock-in of regional development in Ruhr area. In G. Grabher (Ed.), *The embedded firm* (pp. 255–277). London: Routledge.

Green, A. (2004). Is relocation redundant? Observations on the changing nature and impacts of employment-related geographical mobility in the UK. *Regional Studies*, *38*, 629–641. https://doi.org/10.1080/003434042000240941

Hofmeister, H. (2005). Geographic mobility of couples in the United States: Relocation and commuting trends. *Zeitschrift Für Familienforschung*, *17*, 115–128.

Horta, H., Veloso, F. M., & Grediaga, R. (2010). Navel gazing: Academic inbreeding and scientific productivity. *Management Science*, *56*, 414–429. https://doi.org/10.1287/mnsc.1090.1109

Ihlanfeldt, K., & Mayock, T. (2012). Information, search, and house prices: Revisited. *The Journal of Real Estate Finance and Economics*, *44*, 90–115. https://doi.org/10.1007/s11146-010-9282-z

Ioannides, Y. M., & Loury, L. D. (2004). Job information networks, neighborhood effects, and inequality. *Journal of Economic Literature*, *42*, 1056–1093. https://doi.org/10.1257/0022051043004595

Kambourov, G., & Manovskii, I. (2009). Occupational specificity of human capital. *International Economic Review*, *50*, 63–115. https://doi.org/10.1111/j.1468-2354.2008.00524.x

KiM Netherlands Institute for Transport Policy Analysis (2013). Mobiliteitsbalans, 2013. URL: https://www.rijksoverheid.nl/documenten/rapporten/2013/10/29/kim-rapport-mobiliteitsbalans-2013

Krupka, D. J. (2009). Location–specific human capital, location choice and amenity demand. *Journal of Regional Science*, *49*, 833–854. https://doi.org/10.1111/j.1467-9787.2009.00614.x

Lambson, V. E., McQueen, G. R., & Slade, B. A. (2004). Do out-of-state buyers pay more for real estate? An examination of anchoring-induced bias and search costs. *Real Estate Economics*, *32*, 85–126. https://doi.org/10.1111/j.1080-8620.2004.00085.x

Lehmer, F., & Ludsteck, J. (2011). The returns to job mobility and inter–regional migration: Evidence from Germany. *Papers in Regional Science*, *90*, 549–571. https://doi.org/10.1111/j.1435-5957.2010.00326.x

Lehmer, F., & Möller, J. (2008). Group-specific effects of inter-regional mobility on earnings – A microdata analysis for Germany. *Regional Studies*, *42*, 657–674. https://doi.org/10.1080/00343400701543686

Maskell, P., & Malmberg, A. (2007). Myopia, knowledge development and cluster evolution. *Journal of Economic Geography*, *7*, 603–618. https://doi.org/10.1093/jeg/lbm020

McCall, J. J. (1970). Economics of information and job search. *The Quarterly Journal of Economics*, *84*, 113–126. https://doi.org/10.2307/1879403

Morkutė, G., & Koster, S. (2016). Human capital as a location factor: An empirical investigation of relocating firms and their labour force in the Netherlands. *Papers in Regional Science*, *97*, 595–616. https://doi.org/10.1111/pirs.12257

Neal, D. (1995). Industry-specific human capital: Evidence from displaced workers. *Journal of Labor Economics*, *13*, 653–677. https://doi.org/10.1086/298388

Neffke, F., & Henning, M. (2013). Skill relatedness and firm diversification. *Strategic Management Journal*, *34*, 297–316. https://doi.org/10.1002/smj.2014

Nooteboom, B., van Haverbeke, W., Duysters, G., Gilsing, V., & van den Oord, A. (2007). Optimal cognitive distance and absorptive capacity. *Research Policy*, *36*, 1016–1034. https://doi.org/10.1016/j.respol.2007.04.003

O'Keefe, S. (2004). Locational choice of AFDC recipients within California: A conditional logit analysis. *Journal of Public Economics*, *88*, 1521–1542. https://doi.org/10.1016/S0047-2727(02)00179-2

Östbring, L., & Lindgren, U. (2013). Labour mobility and plant performance: On the (dis) similarity between labour- and capital-intensive sectors for knowledge diffusion and productivity. *Geografiska Annaler: Series B, Human Geography*, *95*, 287–305. https://doi.org/10.1111/geob.12026

Rigby, D. L., & Essletzbichler, J. (2006). Technological variety, technological change and a geography of production techniques. *Journal of Economic Geography*, *6*, 45–70. https://doi.org/10.1093/jeg/lbi015

Rosenkopf, L., & Almeida, P. (2003). Overcoming local search through alliances and mobility. *Management Science*, *49*, 751–766. https://doi.org/10.1287/mnsc.49.6.751.16026

Saks, R. E., & Wozniak, A. (2011). Labor reallocation over the business cycle: New evidence from internal migration. *Journal of Labor Economics*, *29*, 697–739. https://doi.org/10.1086/660772

Schneider, L., & Kubis, A. (2010). Are there gender–specific preferences for location factors? A grouped conditional logit-model of interregional migration flows in Germany. *Schmollers Jahrbuch*, *130*, 143–168. https://doi.org/10.3790/schm.130.2.143

Simonen, J., & McCann, P. (2010). Knowledge transfers and innovation: The role of labour markets and R&D co-operation between agents and institutions. *Papers in Regional Science*, *89*, 295–309. https://doi.org/10.1111/j.1435-5957.2010.00299.x

Sjaastad, L. A. (1962). The costs and returns of human migration. *Journal of Political Economy*, *70*, 80–93. https://doi.org/10.1086/258726

Statistics Netherlands (2014). Bevolkingskernen in Nederland, 2011. URL: https://www.cbs.nl/nl-nl/achtergrond/2014/13/bevolkingskernen-in-nederland-2011

Statistics Netherlands (2016). *Transport and Mobility*, 2016. Retrieved from https://www.cbs.nl/en-gb/publication/2016/25/transport-and-mobility-2016

Sullivan, P. (2010). Empirical evidence on occupation and industry specific human capital. *Labour Economics*, *17*, 567–580. https://doi.org/10.1016/j.labeco.2009.11.003

Timmermans, B., & Boschma, R. (2013). The effect of intra- and inter-regional labour mobility on plant performance in Denmark: The significance of related labour inflows. *Journal of Economic Geography*, *14*(2), 289–311. https://doi.org/10.1093/jeg/lbs059

Topa, G. (2011). *Labor markets and referrals. Handbook of social economics*. Amsterdam: North-Holland.

Train, K. E. (2007). *Discrete choice models with simulation*. New York: Cambridge University Press.

Venhorst, V. A., & Cörvers, F. (2018). Entry into working life: Internal migration and the job match quality of higher–educated graduates. *Journal of Regional Science*, *58*, 116–140. https://doi.org/10.1111/jors.12347

Yankow, J. J. (2003). Migration, job change, and wage growth: A new perspective on the pecuniary return to geographic mobility. *Journal of Regional Science*, *43*, 483–516. https://doi.org/10.1111/1467-9787.00308

Yezer, A. M. J., & Thurston, L. (1976). Migration patterns and income change: Implications for the human capital approach to migration. *Southern Economic Journal*, *42*, 693–702. https://doi.org/10.2307/1056262

Zaiceva A (2006). Self-selection and the returns to geographic mobility: What can be learned from the German reunification "experiment". IZA Working Paper no 2524.

How to cite this article: Morkutė G. Location-specific knowledge in spatial job search and its outcomes: An empirical investigation. *Pap Reg Sci*. 2019;98:1373–1395. https://doi.org/10.1111/pirs.12418

APPENDIX

TABLE A1 Descriptive statistics of continuous variables (4,436 observations)

	Mean	Standard deviation
CHANGEWAGE	0.093	0.430
DISTWORKREG	0.555	0.486
CHANGECOMDIST	−0.361	0.461
WAGE	3.062	0.618
AGE	39.159	10.380
COMDIST	0.817	0.340
REGPOPDENS	1.477	1.270
REGWAGE	18.885	1.603
LQ	2.067	5.776
UNEMPL	6.234	1.621
REGPOPDENSNEW	1.392	1.242
REGWAGENEW	18.822	1.604
LQNEW	1.715	4.749

TABLE A2 Value frequencies of some of the categorical variables (percentages) (4,436 observations)

	Value					
	0	1	2	3	4	5
DURWORKREG	34.87	20.18	10.55	9.08	6.76	18.55
TENUREFIRM	38.01	23.44	9.63	8.27	6.06	14.59
GENDER (2 = female)		81.70	18.30			

TABLE A3 Correlation table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
CHANGEWAGE (1)	1.00												
DISTWORKREG (2)	0.01	1.00											
COMDIST (3)	−0.03	0.41	1.00										
CHANGECOMDIST (4)	0.02	−0.64	−0.44	1.00									
WAGE (5)	−0.56	−0.06	0.00	0.08	1.00								
AGE (6)	−0.18	−0.08	0.08	0.08	0.45	1.00							
REGPOPDENS (7)	0.02	−0.15	−0.14	0.08	0.05	−0.10	1.00						
REGPOPDENSNEW (8)	0.05	−0.19	−0.16	0.14	0.05	−0.10	0.52	1.00					
REGWAGE (9)	0.03	−0.22	−0.18	0.13	0.06	−0.08	0.72	0.41	1.00				
REGWAGENEW (10)	0.03	−0.24	−0.16	0.16	0.07	−0.07	0.41	0.71	0.47	1.00			
LQ (11)	0.01	−0.07	−0.04	0.04	0.02	−0.04	0.05	0.07	0.013	0.10	1.00		
LQNEW (12)	0.01	−0.09	−0.03	0.07	0.01	−0.03	0.04	0.08	0.10	0.14	0.60	1.00	
UNEMPL (13)	0.02	0.01	−0.07	−0.04	0.04	−0.07	0.62	0.34	0.45	0.24	0.02	−0.01	1.00

TABLE A4 OLS regressions on wage growth (various specifications)

	Dep. Var. = CHANGEWAGE		
	Education level included	DISTWORKREG squared included	DISTWORKREG and CHANGECOMDIST replaced by their natural logarithms
Changes in specification, compared to column (1) in table (3)	(1)	(2)	(3)
DISTWORKREG	0.041** (0.018)	0.019 (0.028)	
DISTWORKREG × DISTWORKREG		0.006 (0.016)	
DISTWORKREG, natural logarithm			0.000 (0.001)
CHANGECOMDIST	0.073*** (0.017)	0.069*** (0.013)	
CHANGECOMDIST, natural logarithm			0.005*** (0.001)
WAGE	−1.132*** (0.070)	−1.152*** (0.069)	−1.152*** (0.069)
WAGE × WAGE	0.112*** (0.013)	0.128*** (0.012)	0.129*** (0.012)
GENDER = woman	−0.042** (0.015)	−0.006 (0.013)	−0.006 (0.013)
AGE	0.048*** (0.005)	0.043*** (0.005)	0.043*** (0.005)
AGE x AGE	−0.001*** (0.000)	−0.001*** (0.000)	−0.000*** (0.000)
TENUREFIRM = 1 (0 is the reference category)	0.059*** (0.014)	0.058*** (0.012)	0.058*** (0.012)
TENUREFIRM = 2	0.064** (0.021)	0.059*** (0.017)	0.060*** (0.017)
TENUREFIRM = 3	0.082*** (0.020)	0.072*** (0.020)	0.073*** (0.020)
TENUREFIRM = 4	0.080** (0.026)	0.085*** (0.020)	0.087*** (0.020)
TENUREFIRM = 5	0.067*** (0.020)	0.062*** (0.015)	0.065*** (0.015)
REGWAGE	0.072 (0.050)	0.078*** (0.041)	0.076* (0.042)
REGPOPDENS	−0.006 (0.011)	0.003 (0.009)	0.003 (0.009)
LQ	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
REGWAGENEW	0.085* (0.051)	0.081* (0.041)	0.077* (0.042)
REGPOPDENSNEW	−0.000 (0.000)	0.000** (0.000)	0.000** (0.000)
LQNEW	−0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
REGWAGE × REGWAGENEW	−0.004 (0.003)	−0.004* (0.002)	−0.004* (0.002)
REGPOPDENS × REGPOPDENSNEW	0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
LQ x LQNEW	0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
Educ. Level = medium (educ. Level = low is the reference category)	0.103*** (0.022)		

(Continues)

TABLE A4 (Continued)

	Dep. Var. = CHANGEWAGE		
	Education level included	DISTWORKREG squared included	DISTWORKREG and CHANGECOMDIST replaced by their natural logarithms
Changes in specification, compared to column (1) in table (3)	**(1)**	**(2)**	**(3)**
Educ. Level = high	0.222** (0.026)		
Observations	2,951	4,436	4,436
R squared	0.5622	0.4675	0.4666

Notes: Robust standard errors in parentheses. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Employees with no more than high school education are considered to have a low education level, employees with associate or higher degrees are considered to have a high education level. Employees in between these two categories are considered to have a medium education level.

TABLE A5 Treatment effects: Outcome and treatment assignment equations

	DISTWORKREG <25	25 km < = DISTWORKREG <50 km	50 km < = DISTWORKREG <75 km	75 km < = DISTWORKREG <100 km	100 km < = DISTWORKREG <125 km	125 km < = DISTWORKREG <150 km	DISTWORKREG > = 150 km
Treatment effects (reference category: DISTWORKREG <25)		−0.075 (0.054)	−0.000 (0.054)	0.009 (0.073)	−0.107 (0.078)	0.021 (0.114)	−0.021 (0.224)
	Outcome equations						
CHANGECOMDIST	−0.069 (0.132)	0.131 (0.106)	0.016 (0.043)	0.031 (0.029)	0.021 (0.030)	0.029 (0.023)	0.077** (0.024)
WAGE	−1.281*** (0.173)	−1.293*** (0.181)	−1.099*** (0.070)	−0.983*** (0.018)	−1.869*** (0.096)	−0.571** (0.225)	−1.019*** (0.070)
WAGE x WAGE	0.175*** (0.026)	0.147*** (0.031)	0.098*** (0.009)	0.072*** (0.011)	0.244*** (0.016)	0.054 (0.038)	0.148*** (0.013)
GENDER = woman	−0.029 (0.023)	0.059 (0.043)	0.047 (0.052)	0.026 (0.032)	0.063 (0.059)	0.085 (0.056)	0.007 (0.043)
AGE	0.031*** (0.006)	0.078*** (0.022)	0.048*** (0.013)	0.075*** (0.011)	0.057*** (0.014)	0.040 (0.026)	−0.011 (0.017)
AGE × AGE	−0.000*** (0.000)	−0.001** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001* (0.000)	0.000 (0.000)
TENUREFIRM = 1 (0 is the reference category)	0.021 (0.019)	0.092 (0.063)	0.074** (0.033)	0.056* (0.031)	0.185** (0.061)	−0.007 (0.072)	−0.025 (0.043)
TENUREFIRM = 2	0.020 (0.025)	−0.004 (0.095)	0.149*** (0.041)	0.025 (0.047)	0.146** (0.060)	0.068 (0.104)	0.253*** (0.051)
TENUREFIRM = 3	0.012 (0.019)	0.100* (0.060)	0.012 (0.062)	0.092* (0.053)	0.204** (0.066)	−0.034 (0.085)	−0.086 (0.070)
TENUREFIRM = 4	0.008 (0.042)	−0.009 (0.061)	0.108** (0.040)	0.133** (0.046)	−0.003 (0.074)	0.067 (0.092)	0.198** (0.087)
TENUREFIRM = 5	0.005 (0021)	0.056 (0.065)	0.155*** (0.032)	0.107** (0.046)	0.145** (0.063)	0.083 (0.074)	0.283** (0.104)
REGWAGE	0.062 (0.042)	0.097 (0.178)	0.111 (0.110)	0.151 (0.10)	−0.369* (0.206)	0.629** (0.219)	−0.453** (0.182)
REGPOPDENS	0.003 (0.017)	0.046 (0.044)	−0.010 (0.019)	0.035* (0.019)	−0.028 (0.032)	−0.007 (0.031)	−0.015 (0.033)

(Continues)

TABLE A5 (Continued)

	DISTWORKREG <25	25 km < = DISTWORKREG <50 km	50 km < = DISTWORKREG <75 km	75 km < = DISTWORKREG <100 km	100 km < = DISTWORKREG <125 km	125 km < = DISTWORKREG <150 km	DISTWORKREG > = 150 km
LQ	−0.000 (0.002)	0.003 (0.003)	−0.000 (0.001)	0.004 (0.005)	0.002 (0.007)	−0.003 (0.008)	−0.002 (0.006)
REGWAGENEW	0.075* (0.04)	0.095 (0.189)	0.143 (0.109)	0.145 (0.102)	−0.421** (0.211)	0.632** (0.231)	−0.460** (0.190)
REGPOPDENSNEW	0.040** (0.020)	0.020 (0.036)	0.017 (0.021)	−0.006 (0.027)	0.110** (0.051)	0.050 (0.038)	0.025 (0.050)
LQNEW	−0.005 (0.004)	0.012* (0.007)	0.009 (0.008)	−0.003* (0.002)	0.033** (0.014)	−0.018 (0.016)	−0.010 (0.014)
REGWAGE × REGWAGENEW	−0.003 (0.002)	−0.004 (0.010)	−0.006 (0.006)	−0.008 (0.006)	0.23** (0.011)	−0.036** (0.013)	0.026** (0.010)
REGPOPDENS × REGPOPDENSNEW	−0.008 (0.005)	−0.014 (0.015)	−0.015* (0.009)	0.001 (0.015)	−0.075 (0.049)	−0.004 (0.027)	0.020 (0.037)
LQ × LQNEW	0.000 (0.000)	0.000 (0.001)	0.001 (0.001)	0.003 (0.003)	−0.002* (0.001)	0.006 (0.005)	−0.006 (0.012)
	Treatment assignment equations						
COMDIST		−2.495*** (0.342)	−3.529*** (0.268)	0.380** (0.167)	1.846*** (0.192)	3.381*** (0.239)	4.568*** (0.320)
WAGE		−0.959** (0.321)	−0.885** (0.287)	−0.230 (0.534)	−0.725** (0.360)	−0.482 (0.472)	−0.802** (0.392)
WAGE × WAGE		0.115** (0.057)	0.133** (0.049)	0.016 (0.088)	0.086 (0.060)	0.114 (0.074)	0.157** (0.066)
GENDER = woman		−0.167 (0.161)	−0.051 (0.109)	0.230* (0.130)	−0.005 (0.179)	−0.373 (0.249)	−0.085 (0.239)
AGE		0.209*** (0.049)	0.069** (0.033)	0.053 (0.038)	0.110** (0.048)	−0.065 (0.061)	−0.025 (0.063)
AGE × AGE		−0.003*** (0.001)	−0.001** (0.000)	−0.001* (0.000)	−0.001** (0.001)	0.000 (0.001)	−0.000 (0.001)
DURWORKREG = 1 (0 is the reference category)		−0.099 (0.160)	−0.117 (0.118)	−0.094 (0.136)	0.106 (0.175)	0.074 (0.223)	−0.107 (0.247)

(Continues)

TABLE A5 (Continued)

	DISTWORKREG <25	25 km < = DISTWORKREG <50 km	50 km < = DISTWORKREG <75 km	75 km < = DISTWORKREG <100 km	100 km < = DISTWORKREG <125 km	125 km < = DISTWORKREG <150 km	DISTWORKREG > = 150 km
DURWORKREG = 2		−0.415** (0.200)	−0.486*** (0.148)	−0.290* (0.173)	0.034 (0.214)	−0.237 (0.316)	0.088 (0.341)
DURWORKREG = 3		−0.453** (0.207)	−0.659*** (0.156)	−0.282 (0.179)	−0.228 (0.242)	−0.220 (0.330)	−0.007 (0.311)
DURWORKREG = 4		−0.408* (0.238)	−0.368** (0.174)	−0.414* (0.214)	−0.226 (0.270)	−0.199 (0.335)	−0.735 (0.468)
DURWORKREG = 5		−0.856*** (0.180)	−0.836*** (0.127)	−0.649*** (0.149)	−0.651*** (0.200)	−0.121 (0.247)	−0.277 (0.268)
REGWAGE		0.033 (0.048)	−0.126*** (0.040)	−0.198*** (0.047)	0.286*** (0.058)	−0.211** (0.082)	−0.549*** (0.098)
REGPOPDENS		−0.225** (0.075)	−0.157** (0.054)	−0.291*** (0.067)	−0.053 (0.084)	−0.356** (0.122)	−0.021 (0.142)
LQ		−0.013 (0.008)	−0.030** (0.014)	−.0021** (0.009)	−0.027 (0.020)	−0.036 (0.028)	−0.019 (0.034)
UNEMPL		−0.007 (0.052)	0.155*** (0.034)	0.218*** (0.038)	0.103** (0.051)	0.307*** (0.057)	0.463*** (0.066)
Observations	1,490	416	11,172	627	325	197	209

Notes: Robust standard errors in parentheses.

***$p < 0.01$,

**$p < 0.05$,

*$p < 0.1$.

DOI: 10.1111/pirs.12418

Resumen. Este artículo investiga cómo influye la ubicación del lugar de trabajo en la posterior búsqueda espacial de trabajo por los demandantes de empleo. Además, se evalúa en qué medida la movilidad entre regiones laborales está asociada al crecimiento salarial. Los resultados muestran que la región de trabajo funciona como un polo de atracción prominente en torno al cual se centra la búsqueda de nuevo empleo. Los solicitantes de empleo que encuentran un trabajo lejos de su antigua región de trabajo reciben una pequeña prima salarial, pero esta prima desaparece si se tiene en cuenta la selectividad. Se concluye que los empleados demuestran una enorme atracción a las mismas ubicaciones de sus lugares de trabajo, y que esto está motivado por asimetrías en los costos de búsqueda. No se han encontrado pruebas de que, por sí misma, la movilidad entre regiones de trabajo afecte a los salarios.

抄録: 本稿では、職場の立地が、求職者のその後の空間的な求職活動にどのように影響するかを検討する。さらに、労働地域間の移動が、賃金の上昇にどの程度関連するかを評価する。結果から、職場の地域は新しい職探しの中心となる、顕著な地理的アンカーとして機能していることが示された。前の職場の地域から遠い地域の仕事に就く者が得る賃金プレミアムは少ないが、選択性を考慮した場合では、このプレミアムは消滅する。結論として、被雇用者には、少なからず自分の職場の立地にとどまる傾向があり、これは職探しのコストと非対称性に動機づけられているといえる。労働地域間の移動が本質的に賃金に影響することを示すエビデンスは得られなかった。